

CLAIMS

What is claimed is:

1. A method of routing a flow of frames comprising:
applying a correspondence between at least some logical ports and physical ports of a switch; and
balancing frame traffic through said switch, said frame traffic including frames exiting said switch via said physical ports, a selected physical port for at least one of said frames exiting said switch being selected based at least in part on said correspondence.
2. The method of claim 1, wherein a selected physical port for each of said frames exiting said switch is selected based at least in part on said correspondence.
3. The method of claim 1, wherein said balancing frame traffic comprises balancing said frame traffic over a set of links coupling said switch to other devices.
4. The method of claim 3, wherein four of said links comprise a trunked group.
5. The method of claim 3, wherein eight of said links comprise a trunked group.

6. The method of claim 3, wherein said balancing comprises applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said switch.
7. The method of claim 6, wherein applying a pseudo-random process comprises applying a hash function.
8. The method of claim 6, wherein said correspondence is employed to determine the physical port to which to route said particular frame based at least in part on the logical port selected as said particular port.
9. The method of claim 3, wherein said balancing comprises applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said switch.
10. The method of claim 9, wherein applying a pseudo-random process comprises applying a hash function.
11. The method of claim 9, wherein said correspondence is employed to determine the physical port to which to route each of said particular frames based at least in part on the logical port selected for each of said particular ports.
12. The method of claim 1, wherein said balancing comprises applying weights to select a particular port of said switch as an egress port for a particular frame of said frames exiting said switch, said particular port being selected from

among available logical ports of said switch.

13. The method of claim 12, wherein said correspondence is employed to determine the physical port to which to route said particular frame based at least in part on the selected logical port.

14. The method of claim 1, wherein a selected physical port for at least one of said frames exiting said switch comprises, for each of said frames exiting said switch, a physical port being selected based at least in part on said correspondence.

15. The method of claim 14, wherein said balancing comprises applying weights to select a particular port of said switch as an egress port for each of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.

16. The method of claim 15, wherein said correspondence is employed to determine the physical port corresponding to each of said particular ports to which to route each of said frames exiting said switch, said corresponding physical port being based at least in part on the logical port selected as the particular port.

17. The method of claim 1, wherein a selected physical port for at least one of said frames exiting said switch is further selected based at least in part on a source tag and/or a destination tag added to said frame after said frame enters said switch.

18. The method of claim 17, wherein said source tag and/or said destination tag is stripped off said frame before said frame exits said switch.

19. The method of claim 1, wherein a selected physical port for each of said frames exiting said switch is further selected based at least in part on a source tag and/or a destination tag added to each of said frames after said frames enter said switch.

20. The method of claim 19, wherein said source tag and/or said destination tag is stripped off each of said frames before each of said frames exits said switch.

21. An apparatus comprising:
a switch, said switch including a processor and memory;
said switch further including logical and physical ports, and having the capability to route a flow of frames exiting said switch;
said switch being adapted to apply a correspondence between at least some of said logical ports and said physical ports of said switch, and being further adapted to balance frame traffic through said switch, said frame traffic including frames exiting said switch via said physical ports, a selected physical port for at least one of said frames exiting said switch being selected based at least in part on said correspondence.

22. The apparatus of claim 21, wherein said switch is adapted to select a physical port for each of said frames exiting said switch based at least in part on said correspondence.

23. The apparatus of claim 21, wherein said switch is adapted to balance said frame traffic over a set of links coupling said switch to other devices.

24. The apparatus of claim 23, wherein four of said links comprise a trunked group.

25. The apparatus of claim 23, wherein eight of said links comprise a trunked group.

26. The apparatus of claim 23, wherein said switch is adapted to balance frame traffic by applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said switch.

27. The apparatus of claim 26, wherein said switch is adapted to apply a pseudo-random process that comprises applying a hash function.

28. The apparatus of claim 26, wherein said switch is adapted to apply said correspondence to determine the physical port to which to route said particular frame based at least in part on the logical port selected as said particular port.

29. The apparatus of claim 23, wherein said switch is adapted to apply a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said switch.

30. The apparatus of claim 29, wherein said switch is adapted to apply a pseudo-random process that comprises applying a hash function.

31. The apparatus of claim 29, wherein said switch is adapted to employ said correspondence to determine the physical port to which to route each of said particular frames based at least in part on the logical port selected for each of said particular ports.

32. The apparatus of claim 21, wherein said switch is adapted to apply weights to select a particular port of said switch as an egress port for a particular frame of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.

33. The apparatus of claim 32, wherein said switch is adapted to employ said correspondence to determine the physical port to which to route said particular frame based at least in part on the selected logical port.

34. The apparatus of claim 21, wherein said switch is adapted to select a physical port for at least one of said frames exiting said switch, said physical port being selected based at least in part on said correspondence.

35. The apparatus of claim 34, wherein said switch is adapted to apply weights to select a particular port of said switch as an egress port for each of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.

36. The apparatus of claim 35, wherein said switch is adapted to employ said

correspondence to determine the physical port corresponding to each of said particular ports to which to route each of said frames exiting said switch, said corresponding physical port being based at least in part on the logical port selected as the particular port.

37. The apparatus of claim 21, wherein said switch is adapted to selected a physical port for at least one of said frames exiting said switch based at least in part on a source tag and/or a destination tag added to said frame after said frame enters said switch.

38. The apparatus of claim 37, wherein said switch is adapted to strip said source tag and/or said destination tag off said frame before said frame exits said switch.

39. The apparatus of claim 21, wherein said switch is adapted to select a physical port for each of said frames exiting said switch based at least in part on a source tag and/or a destination tag added to each of said frames after said frames enter said switch.

40. The apparatus of claim 39, wherein said switch is adapted to strip said source tag and/or said destination tag off each of said frames before each of said frames exits said switch.

41. A switch fabric comprising:
at least a first switch and a second switch;
said first switch including a processor and memory;
said first switch further including logical ports and physical ports, and

having the capability to route a flow of frames exiting said first switch;

said first switch being adapted to apply a correspondence between at least some of said logical ports and said physical ports, and being further adapted to balance frame traffic through said first switch, said frame traffic including frames exiting said first switch via said physical ports, a selected physical port for at least one of said frames exiting said first switch being selected based at least in part on said correspondence.

42. The switch fabric of claim 41, wherein said first switch is adapted to select a physical port for each of said frames exiting said first switch based at least in part on said correspondence.

43. The switch fabric of claim 41, wherein said first switch is adapted to balance said frame traffic over a set of links coupling said first switch to other devices.

44. The switch fabric of claim 43, wherein four of said links comprise a trunked group.

45. The switch fabric of claim 43, wherein eight of said links comprise a trunked group.

46. The switch fabric of claim 43, wherein said first switch is adapted to balance frame traffic by applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said first switch.

47. The switch fabric of claim 46, wherein said first switch is adapted to apply a pseudo-random process that comprises applying a hash function.

48. The switch fabric of claim 46, wherein said first switch is adapted to apply said correspondence to determine the physical port to which to route said particular frame based at least in part on the logical port selected as said particular port.

49. The switch fabric of claim 43, wherein said first switch is adapted to apply a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said first switch.

50. The switch fabric of claim 49, wherein said first switch is adapted to apply a pseudo-random process that comprises applying a hash function.

51. The switch fabric of claim 49, wherein said first switch is adapted to employ said correspondence to determine the physical port to which to route each of said particular frames based at least in part on the logical port selected for each of said particular ports.

52. The switch fabric of claim 51, wherein said first switch is adapted to apply weights to select a particular port of said first switch as an egress port for a particular frame of said frames exiting said first switch, said particular port being selected from among available logical ports of said first switch.

53. The switch fabric of claim 52, wherein said first switch is adapted to employ said correspondence to determine the physical port to which to route said particular frame based at least in part on the selected logical port.

54. The switch fabric of claim 41, wherein said first switch is adapted to select a physical port for at least one of said frames exiting said first switch, said physical port being selected based at least in part on said correspondence.

55. The switch fabric of claim 54, wherein said first switch is adapted to apply weights to select a particular port of said first switch as an egress port for each of said frames exiting said first switch, said particular port being selected from among available logical ports of said first switch.

56. The switch fabric of claim 55, wherein said first switch is adapted to employ said correspondence to determine the physical port corresponding to each of said particular ports to which to route each of said frames exiting said first switch, said corresponding physical port being based at least in part on the logical port selected as the particular port.

57. The switch fabric of claim 41, wherein said first switch is adapted to selected a physical port for at least one of said frames exiting said first switch based at least in part on a source tag and/or a destination tag added to said frame after said frame enters said first switch.

58. The switch fabric of claim 57, wherein said first switch is adapted to strip said source tag and/or said destination tag off said frame before said frame exits

said first switch.

59. The switch fabric of claim 41, wherein said first switch is adapted to selected a physical port for each of said frames exiting said first switch based at least in part on a source tag and/or a destination tag added to each of said frames after said frames enter said first switch.

60. The switch fabric of claim 59, wherein said first switch is adapted to strip said source tag and/or said destination tag off each of said frames before each of said frames exits said first switch.

61. A network comprising:

- a host;

- a physical storage unit;

- a first switch and a second switch communicatively coupled to form a switch fabric;

- said first switch and said second switch further communicatively coupled to said host and said physical storage unit;

- said first switch including a processor and memory, and further including logical ports and physical ports;

- said first switch being adapted to apply a correspondence between at least some of said logical ports and said physical ports, and being further adapted to balance frame traffic through said first switch, said frame traffic including frames exiting said first switch via said physical ports, a selected physical port for at least one of said frames exiting said first switch being selected based at least in part on said correspondence.

62. The network of claim 61, wherein said first switch is adapted to select a physical port for each of said frames exiting said first switch based at least in part on said correspondence.

63. The network of claim 61, wherein said first switch is adapted to balance said frame traffic over a set of links coupling said first switch to other devices.

64. The network of claim 63, wherein four of said links comprise a trunked group.

65. The network of claim 63, wherein eight of said links comprise a trunked group.

66. The network of claim 63, wherein said first switch is adapted to balance frame traffic by applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said first switch.

67. The network of claim 66, wherein said first switch is adapted to apply a pseudo-random process that comprises applying a hash function.

68. The network of claim 66, wherein said first switch is adapted to apply said correspondence to determine the physical port to which to route said particular frame based at least in part on the logical port selected as said particular port.

69. The network of claim 63, wherein said first switch is adapted to apply a

pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said first switch.

70. The network of claim 69, wherein said first switch is adapted to apply a pseudo-random process that comprises applying a hash function.

71. The network of claim 69, wherein said first switch is adapted to employ said correspondence to determine the physical port to which to route each of said particular frames based at least in part on the logical port selected for each of said particular ports.

72. The network of claim 61, wherein said first switch is adapted to apply weights to select a particular port of said first switch as an egress port for a particular frame of said frames exiting said first switch, said particular port being selected from among available logical ports of said first switch.

73. The network of claim 72, wherein said first switch is adapted to employ said correspondence to determine the physical port to which to route said particular frame based at least in part on the selected logical port.

74. The network of claim 61, wherein said first switch is adapted to select a physical port for at least one of said frames exiting said first switch, said physical port being selected based at least in part on said correspondence.

75. The network of claim 74, wherein said first switch is adapted to apply

weights to select a particular port of said first switch as an egress port for each of said frames exiting said first switch, said particular port being selected from among available logical ports of said first switch.

76. The network of claim 75, wherein said first switch is adapted to employ said correspondence to determine the physical port corresponding to each of said particular ports to which to route each of said frames exiting said first switch, said corresponding physical port being based at least in part on the logical port selected as the particular port.

77. The network of claim 61, wherein said first switch is adapted to selected a physical port for at least one of said frames exiting said first switch based at least in part on a source tag and/or a destination tag added to said frame after said frame enters said first switch.

78. The network of claim 77, wherein said first switch is adapted to strip said source tag and/or said destination tag off said frame before said frame exits said first switch.

79. The network of claim 61, wherein said first switch is adapted to selected a physical port for each of said frames exiting said first switch based at least in part on a source tag and/or a destination tag added to each of said frames after said frames enter said first switch.

80. The network of claim 79, wherein said first switch is adapted to strip said source tag and/or said destination tag off each of said frames before each of said frames exits said first switch.

81. An article comprising: a storage medium having stored thereon instructions, that when executed, result in performance of a method of routing a flow of frames comprising:

applying a correspondence between logical ports and physical ports of a switch;

balancing frame traffic through said switch, said frame traffic including frames exiting said switch via said physical ports, a selected physical port for at least one of said frames exiting said switch being selected based at least in part on said correspondence.

82. The article of claim 81, wherein said instructions, when further executed, result in: a selected physical port for each of said frames exiting said switch being selected based at least in part on said correspondence.

83. The article of claim 81, wherein said instructions, when further executed, result in: said balancing frame traffic comprising balancing said frame traffic over a set of links coupling said switch to other devices.

84. The article of claim 83, wherein said instructions, when further executed, result in: four of said links comprising a trunked group.

85. The article of claim 83, wherein said instructions, when further executed, result in: eight of said links comprise a trunked group.

86. The article of claim 83, wherein said instructions, when further executed, result in: said balancing comprising applying a pseudo-random process to select

a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said switch.

87. The article of claim 86, wherein said instructions, when further executed, result in: said applying a pseudo-random process comprising applying a hash function.

88. The article of claim 86, wherein said instructions, when further executed, result in: said correspondence being employed to determine the physical port to which to route said particular frame based at least in part on the logical port selected as said particular port.

89. The article of claim 83, wherein said instructions, when further executed, result in: said balancing comprising applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said switch.

90. The article of claim 89, wherein said instructions, when further executed, result in: said applying a pseudo-random process comprising applying a hash function.

91. The article of claim 89, wherein said instructions, when further executed, result in: said correspondence being employed to determine the physical port to which to route each of said particular frames based at least in part on the logical port selected for each of said particular ports.

92. The article of claim 91, wherein said instructions, when further executed, result in: said balancing comprising applying weights to select a particular port of said switch as an egress port for a particular frame of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.

93. The article of claim 92, wherein said instructions, when further executed, result in: said correspondence being employed to determine the physical port to which to route said particular frame based at least in part on the selected logical port.

94. The article of claim 81, wherein said instructions, when further executed, result in: a selected physical port for at least one of said frames exiting said switch comprising, for each of said frames exiting said switch, a physical port being selected based at least in part on said correspondence.

95. The article of claim 94, wherein said instructions, when further executed, result in: said balancing comprising applying weights to select a particular port of said switch as an egress port for each of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.

96. The article of claim 95, wherein said instructions, when further executed, result in: said correspondence being employed to determine the physical port corresponding to each of said particular ports to which to route each of said frames exiting said switch, said corresponding physical port being based at least in part on the logical port selected as the particular port.

97. The article of claim 81, wherein said instructions, when further executed, result in: a selected physical port for at least one of said frames exiting said switch being further selected based at least in part on a source tag and/or a destination tag added to said frame after said frame enters said switch.

98. The article of claim 97, wherein said instructions, when further executed, result in: said source tag and/or said destination tag being stripped off said frame before said frame exits said switch.

99. The article of claim 81, wherein said instructions, when further executed, result in: a selected physical port for each of said frames exiting said switch being further selected based at least in part on a source tag and/or a destination tag added to each of said frames after said frames enter said switch.

100. The article of claim 99, wherein said instructions, when further executed, result in: said source tag and/or said destination tag being stripped off each of said frames before each of said frames exits said switch.

101. An article comprising: a storage medium having stored thereon instructions that, when executed, result in performance of a method of initializing a switch to route a flow of frames comprising:

initializing a correspondence between at least some logical ports and physical ports of said switch; and

further initializing said switch to balance frame traffic through said switch, said frame traffic including frames exiting said switch via said physical ports, a selected physical port for at least one of said frames exiting said switch being

selected based at least in part on said correspondence.

102. The article of claim 100, wherein said instructions, when further executed, result in: initializing said switch to balance said frame traffic over a set of links coupling said switch to other devices.

103. The article of claim 100, wherein said instructions, when further executed, result in: initializing said switch to balance frame traffic by applying a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for a particular frame of said frames exiting said switch.

104. The article of claim 103, wherein said instructions, when further executed, result in: initializing said switch to apply a pseudo-random process to select a particular port as an egress port, said particular port being selected from among available logical ports, said particular port being selected for each particular frame of said frames exiting said switch.

105. The article of claim 100, wherein said instructions, when further executed, result in: initializing said switch to balance frame traffic by applying weights to select a particular port of said switch as an egress port for a particular frame of said frames exiting said switch, said particular port being selected from among available logical ports of said switch.